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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,647	03/19/2004	Nan-Jung Chen	N1085-00129	7757

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EXAMINER

HIRL, JOSEPH P

ART UNIT

PAPER NUMBER

2129

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/28/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/804,647	<b>Applicant(s)</b> CHEN, NAN-JUNG	
	<b>Examiner</b> Joseph P. Hirl	<b>Art Unit</b> 2129	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This Office Action is in response to an AMENDMENT entered December 12, 2006 for the patent application 10/804647 filed on March 19, 2004.
2. The First Office Action of September 15, 2006 is fully incorporated into this Final Office Action by reference.

### ***Status of Claims***

3. Claims 1-10 are pending in this application.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Suresh et al (IEEE, 0018-9529/94, Fuzzy-Set Approach to Select Maintenance Strategies of Multistate Equipment, referred to as ***Suresh***).

***Claims 1, 8, 9***

Suresh anticipates selecting a plurality of factors relevant to the remaining lifetime of the part, the plurality of factors including a number of semiconductor wafers that have been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of equipment (**Suresh**, p451, c2:16; Examiner's Note (EN): ¶ 7 applies; from the summary, Suresh details a fuzzy-set model for maintenance policy of multistate equipment where the model is based on equipment condition and remaining life; total wafers produced to date would be part of the fuzzy variables); and estimating the remaining lifetime of the part by a fuzzy inference (**Suresh**, p452, c1:5-8; Suresh @ p452, c1:5-8. establishes the degrees of fulfillment related to the remaining lifetime).

***Claim 2***

Suresh anticipates the plurality of factors include a length of time that the part has been used (**Suresh**, p452, c2:9-13).

***Claim 3***

Suresh anticipates replacing the part when the estimated remaining lifetime falls below a threshold value (**Suresh**, p452, c1:15; EN: from p454, Table 3, such would be the condition with  $t = 0$ ).

***Claims 4, 7, 10***

Suresh anticipates the fuzzy inference is based on the following fuzzy rule set, in which P is the number of semiconductor wafers that have been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of

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equipment (**Suresh**, p452, c2:3-7; EN: creating  $M_j$ ;  $u_j$  is the utility of condition  $M_j$  which functionally represents the production of the semiconductor wafers),  $T$  is the length of time that the part has been used (**Suresh**, p451, c2:14;  $n$ ); and  $L$  is the remaining lifetime of the part (**Suresh**, p451, c2:21;  $t$ ): if  $P$  is small, and  $T$  is small, then  $L$  is large; if  $P$  is medium, and  $T$  is small, then  $L$  is medium; if  $P$  is large, and  $T$  is small, then  $L$  is small; if  $P$  is small, and  $T$  is medium, then  $L$  is large; if  $P$  is medium, and  $T$  is medium, then  $L$  is medium; if  $P$  is large, and  $T$  is medium, then  $L$  is small; if  $P$  is small, and  $T$  is large, then  $L$  is medium; if  $P$  is medium, and  $T$  is large, then  $L$  is medium; and if  $P$  is large, and  $T$  is large, then  $L$  is small (**Suresh**, p 454, Table 3; EN: each column is appropriately judged related to the above references and Fig. 8 of the specification; empirical experiences are cited by Suresh @ p452, c2:3-7).

#### ***Claim 5***

Suresh anticipates the fuzzy inference is based on a fuzzy rule set determined using empirical experience (**Suresh**, p451, c1 Summary & Conclusions; c451:Introduction).

#### ***Claim 6***

Suresh anticipates the step of automatically collecting the following data for the part: the number of semiconductor wafers that have been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of equipment, and the length of time that the part has been used (**Suresh**, p451, c1:Introduction; EN: a fully automated system would provide for appropriate record keeping notwithstanding the need for critical maintenance decisions).

***Response to Arguments***

6. Applicant's arguments filed on December 21, 2006 related to Claims 1-10 have been fully considered but are not persuasive.

In reference to Applicant's argument:

In contrast, Suresh is directed to a method using a fuzzy-set approach to determine maintenance strategy policies, and not to determine the remaining lifetime of equipment. In its method, Suresh selects factors, i.e., equipment conditions and remaining life to determine maintenance strategy policies. In other words, Suresh USES remaining life of equipment as a factor for determining maintenance strategy policies. This is distinguished from the claimed invention which ESTIMATES the remaining lifetime of the (equipment) part. Suresh does not use a factor relevant to remaining lifetime of a part for determining the remaining lifetime of the part. Suresh uses equipment conditions including perfect functioning, fairly-well functioning, satisfactory functioning, rather-poor functioning and not functioning. The remaining life of equipment, i.e., the age of equipment, is directly selected for determining maintenance strategy policies. Nothing in Suresh's description or drawings shows that the factors include a number of semiconductor wafers that is relevant to the remaining lifetime of the part.

Further, Suresh merely intends to determine maintenance strategy policies (e.g., a major, medium or minor maintenance) that should be applied for equipment maintenance. Suresh thus uses factors including equipment conditions and remaining life (i.e., the age of the equipment) for determining maintenance strategy policies. For example, if the equipment is new and its condition is perfect functioning, a minor maintenance is selected. In contrast, if the equipment is old and its condition is rather-poor functioning, a major maintenance is selected. Since Suresh directly uses remaining lifetime of equipment as a factor in determining maintenance strategy policies, Suresh does not disclose or suggest modifying its method to select a number of semiconductor wafers which is relevant to the remaining lifetime of the part to estimate remaining lifetime of the part.

Examiner's response:

¶ 9. applies. Suresh identifies fuzzy variable  $x$ ,  $y$  which represent, respectively, condition and remaining life (Suresh, c2:16). Further, Suresh at page 452, c1:5-7 cites: "The remaining life is a triangular fuzzy set/number represented by  $(\alpha, \tau, \beta)$  with equal spreads on both sides, i.e.  $\tau - \alpha = \beta - \tau$ .  $\mu_Y(y) = \text{tri}(y; \alpha, \beta)$ ." Applicant is reminded that Limitations appearing in the specification but not recited in the claim are not read into the claim. Applicant has limited claim 1 to estimating the remaining lifetime of the part by a fuzzy inference ... such statement is not linked to other limitations of claim 1 and such limitation can be anticipated by whatever estimation. Further, claim 1 does not limit

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to factors include a number of semiconductor wafers that is relevant to the remaining lifetime of the part. Applicant is encourage to re-read claim 1 in light of ¶ 9. The discussion provided does not track with the claim limitations.

In reference to Applicant's argument:

Claim 8 recites "... fuzzy inference means for determining degrees of fulfillment of a plurality of rules based on a plurality of factors relevant to the remaining lifetime of the p , the plurality of factors including the number of semiconductor wafers that leave been processed by the piece of semiconductor fabrication equipment since the part was installed in the piece of equipment; and a defuzzifier for estimating, the remaining lifetime of the a based on the degrees of fulfillment of the plurality of rules."

As in arguments set forth above in connection with Claim 1, Claim 8 also recites estimating the remaining lifetime of the part based on factors including number of processed. semiconductor wafers and is similarly distinguished from Suresh. Claim 8 is thus not anticipated by Suresh and the rejection of Claim 8 should be withdrawn.

Examiner's response:

¶ 9. applies. Applicant is advised that it is inappropriate to categorically state:

"Claim 8 is thus not anticipated by Suresh and the rejection of Claim 8 should be withdrawn." without specifically identifying by page, paragraph and line where the applicant's claims are not anticipated by Suresh. Consequently, the examiner has not further considered the above arguments.

### ***Examination Considerations***

7. The claims and only the claims form the metes and bounds of the invention.

"Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in

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the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, I 45-48; p 2100-9, c 1, I 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

8. Examiner's Notes are provided with the cited references to prior art to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but a link to prior art that one of ordinary skill in the art would find inherently appropriate.

Xxx9. condition of the disclosure constitute, on the face of it, the basis and such would be obvious to one of ordinary skill in the art, establishing thereby an inherent prima facie statement.

9. Examiner's Opinion: ¶¶ 7.- 9. apply.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP



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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Claims 1-10 are rejected.

#### ***Correspondence Information***

12. Any inquiry concerning this information or related to the subject disclosure should be directed to the Primary Examiner, Joseph P. Hirl, whose telephone number is (571) 272-3685. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, David R. Vincent can be reached at (571) 272-3080.

Any response to this office action should be mailed to:

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Joseph P. Hirl  
Primary Examiner  
February 21, 2007